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ABSTRACT

Increased reliance on personnel services is placing school districts' business operations in a no-win situation. This report evaluates methods of student population projection in relation to teacher costs. Educational costs reflect personnel costs in light of a decrease in the number of pupils being served. Increased enrollment projections create a cause for concern. Over 60 percent of a district's budget is for teachers' salaries. The most significant cost factor is pupil-to-teacher ratio; therefore, full utilization of staff must be considered. Population projection methods provide estimates of students to be served, including the following: (1) census data analysis--updated every 10 years; (2) saturation analysis--based on land area and zoning; (3) estimates by principals--involving knowledge of attendance trends; (4) cohort-survival--based on student population movement trends. The latter method is most frequently used, along with adjustments based on principals' estimates. Making this projection involves three steps: (1) local births listed from 11 to 7 years earlier and first-grade enrollment for the previous 5 years indicate first grade enrollments; (2) each grade's enrollment for the previous 6 years forecasts enrollment for the remaining grades; and (3) student information is converted to the number of teachers needed. Although numerous methods determine the number of teachers needed, a district must use a suitable process to achieve maximum service and significant cost savings. Charts of sample pupil population projections and projected teacher need are appended. (CJH)

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TOPIC
PROJECTING PERSONNEL NEEDS

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Public elementary and secondary education is a labor intensive industry. With ever increasing requirements for new programs and reduced pupil to teacher ratios in the classrooms, the district's reliance on personnel services is greatly expanding. This trend in placing the business operation of the districts in a no win situation. The number of personnel required and the increasing salaries being established do not provide districts with the ability to initiate any cost containment programs of any significance. This impact of personnel on the total cost of education has been one of the main reasons for the steady increases over the last five years in light of a steady decrease in the number of pupils being served. It really creates a cause for concern when we look at the projections of increasing student populations by the middle of the next decade. This projection can already be seen with the increasing enrollments in the elementary schools.

When we look at the cost of personnel services, we only need to look at the cost of teachers. The majority of any districts budget is in teacher salaries. On average over 60 percent of the total budget of a district is for classroom

teacher's salary. This does not include the cost of fringe benefits or any of the other staff associated directly with the instructional program. This means that any savings we can effect in this area will have the greatest impact on the total operating budget.

Many people correlate the cost level of personnel services directly with the salary schedules. While this is a contributing factor, it is not the major factor. Actually, the biggest factor is the pupil to teacher ratio in the district. This can be illustrated by depicting a school district of 600 students and an average teacher salary of $25,000. If the district has a pupil to teacher ratio of 25 to 1, then the total personnel services cost of the district would be $600,000. (600/25=24 teachers; 24 times $25,000). If the district increased salaries by 10 percent, the total for personnel services would be $660,000. If the district reduced its pupil to teacher ratio by 10 percent, the personnel services cost would increase to $662,500. This example illustrates the point being made in this report. One of the more relevant cost saving item needing consideration is the full utilization of the teaching staff.

It would be an ideal situation to wait until all children reported to school and then hire and assign teachers based on a known student population to be served. However, this is just not practical. Our teaching contracts must be signed in the spring in the preceding fiscal year and all vacancies are

generally filled in the spring or early summer to attract the best teachers. Therefore, it is necessary for the district to have a fairly accurate count of students to be served in order to allow the Personnel Department to hire the correct number of teachers.

There are a number of methods used to project student populations. The following is a list of a number of methods which are commonly used with some comments about each method.

1. Analysis of Census Data: Only updated every ten years.
2. Saturation Analysis: Based on land area and zoning codes.
3. Utility Company Projections: Does not provide information of the timing of houses to be built.
4. Estimates of Principals: Personal knowledge of trends in attendance zone.
5. Cohort-Survival: Based on historical trend of student population movement.

The method used most is the cohort-survival with adjustments in the results based on estimates of the principals. The major flaw in the cohort-survival method is a lack of the procedure being sensitive to a significant event within an attendance zone. This short coming is compensated by the personal knowledge of the principal.

Now that a method has been set to project student populations lets proceed with the steps involved to make the projection. The first information needed is a listing of the births in the county or school district, if available, from 11 years to 7 years earlier and the first grade enrollment for the district or individual school for the last five years. Chart 1 on the following page illustrates now these figures are

used to project future first grade enrollments.

In order to make a projection of the other grade levels, you will need the number of students in each grade for the last six years. Chart 2 presents how these figures are used to projected the enrollment by grade for a future period. You should be cautioned in the use of these figures. First, the further out in the future you project the degree of accuracy in the projections is bound to suffer. Also, if the projections are used for an individual school, they will be less accurate than districtwide projections.

After your student projections have been completed, the next step is to convert the student information to a need for teachers. For elementary schools the process is fairly simple since all students take basically the same subjects and are in self-contained situations with only some departmentalizations. The information needed to make the estimate of teacher needs is a standard for pupil to teacher ratios for the grade levels concerned. Chart 3 provides a listing used in the Rock Hill School District as a range for assigning teachers. Chart 4 takes the information contained in Chart 2 and illustrates the number of teachers needed in the example elementary school.

The process is a little more difficult in the secondary schools since students have latitude in the subjects they take. Chart 5 presents any example of the process used to project the number of teachers needed by subject area.

In conclusion it can be stated that there are many methods used to determine teacher needs. It becomes a process of using the method you are comfortable with and works for your situation. The method used is less important than the fact that a process be used. There are less and less ways business officials can fight the increasing cost of providing educational services. The maximum utilization is one means of making significant cost savings.

CHART 1

EXAMPLE ELEMENTARY SCHOOL
Pupil Population Projection

Year	Births	School Year	First Grade Enrollment	Enrollment to Birth Ratio
1975	1500	1981-82	55	.037
1976	1356	1982-83	74	.055
1977	1374	1983-84	68	.049
1978	1583	1984-85	51	.032
1979	1596	1985-86	62	.039
			Average Ratio	.042

Year	Births	Average Ratio	Projected First Graders	School Year
1980	1669	.042	70	1986-87
1981	1720	.042	72	1987-88
1982	1640	.042	69	1988-89
1983	1632	.042	69	1989-90
1984	1642	.042	69	1990-91

CHART 2

EXAMPLE ELEMENTARY SCHOOL
Pupil Population Projection

School Year	K	1	2	3	4	5	6	Total
1980-81	33	65	59	78	66	60	62	423
1981-82	47	55	71	54	68	64	53	412
1982-83	44	74	56	78	61	68	57	438
1983-84	43	68	55	64	70	60	63	423
1984-85	44	51	65	45	58	61	57	381
1985-86	38	62	46	58	49	61	64	378
Total of 1st Five Years	211	313	306	319	323	313	292	
Total of 2nd Five Years	216	310	293	299	306	314	294	
Divide	K/1	1/B	2/1	3/2	4/3	5/4	6/5	
Survival Ratio	.681	.042	.936	.977	.959	.972	.939	
1986-87	49	70	58	45	56	48	57	383
1987-88	47	72	66	57	43	54	45	384
1988-89	47	69	67	64	55	42	51	395
1989-90	47	69	65	65	61	53	39	399
1990-91	47	69	65	64	62	59	50	416

CHART 3

TEACHER ASSIGNMENT CRITERIA

ELEMENTARY

Program	Minimum	Goal	Maximum
Kindergarten			
1 section	15	30	30
2 sections	31	60	60
3	61	90	90
4	91	120	120
Grade 1			
2 sections	30	42	46
3	47	63	69
4	70	84	92
5	93	105	112
6	113	126	132
7	133	147	151
8	152	168	168
Grades 2-3			
2 sections	33	42	50
3	51	63	72
4	73	84	92
5	93	105	113
6	114	126	132
7	133	147	151
8	152	168	168
Grades 4-6			
2 sections	40	56	60
3	61	84	90
4	91	112	120
5	121	140	148
6	149	168	174
7	175	196	200
8	201	224	224

SECONDARY

Language Arts and Math	14	25	28
Labs(eng.&math)	8	12	15
Remedial	8	12	15
AP	10	20	22
P.E., Music	20	40	40
All Other	16	28	30

CHART 4

EXAMPLE ELEMENTARY SCHOOL

Projected Teacher Need

Grades	Current Students	Current Teachers	Current Ratio	Projected Students	Projected Teachers	Projected Ratio
K	49	1	49.0	47	1	47.0
1	70	4	17.5	72	4	18.0
2	58	3	19.3	66	3	22.0
3	45	2	22.5	57	3	19.0
4	56	2	28.0	43	2	21.5
5	48	2	24.0	54	2	27.0
6	57	2	28.5	45	2	22.5
Tot	383	16	23.9	384	17	22.6

CHART 5

EXAMPLE HIGH SCHOOL
Projected Teacher Need

I. Projected Membership by Grade Level

Grade:	9	10	11	12	Sp	Total
Membership:	485	450	410	350	105	1800

II. Analysis of Course Enrollments

Course	Desired Load	Percent	Students	Grade Level	Teachers
Math 1	27	10	180	9	1.3
Math 2	27	8	144	10,11,12	1.1
Math 3	27	16	288	9,10,11	2.1
Math 4	27	12	216	10,11	1.6
Math 5	27	6	108	11,12	0.8
Math 6	27	12	216	10,11	1.6
Math 7	27	10	180	9	1.3
Math 8	27	9	162	10,11	1.2
				Total Math Teachers	11.0